

## **DETAILED ACTION**

### ***Oath/Declaration***

The newly executed declaration filed 07/07/2008 satisfies the requirements of the previous objection. The objection is withdrawn.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3 and 4 rejected under 35 U.S.C. 103(a) as being unpatentable over Matschke, et al (U.S. Patent 5,874,741) in view of Kaiser, et al (U.S. Patent Application Publication 2002/0096648).

**Regarding claim 1**, Matschke discloses an apparatus for the continuous cold sterilization of a fluid, the apparatus comprising at least one ultraviolet radiation source (14) and at least one duct (3), through which the fluid flows, permeable to such radiation, the duct having a portion that extends helically about the source (Fig. 2), wherein the helical portion is arranged in a chamber (1), the walls of the chamber having reflective surfaces (column 3, lines 24-25), the distance between the walls and the helical portion being sufficient to allow circulation of air therebetween (apparent from Fig. 2, and inherent in the elliptical design of the housing combined with the helical shape of the duct), but fails to teach the helical portion of the duct having an elliptically-shaped passage section, the major axis of which is generally perpendicular to the

direction of irradiation. However, Kaiser teaches a similar apparatus with a UV source (1) surrounded by a helical duct (27), in which the duct has an elliptically-shaped passage section (paragraph 0027), the major axis of which is generally perpendicular to the direction of irradiation (paragraph 0025). Further, Kaiser provides a motivation for this particular shape of duct, in that attenuation of UV light is avoided (paragraph 0025). Because these teachings are analogous art, one of ordinary skill in the art would be familiar with them and have motivation (given by Kaiser) to combine the teachings to provide the apparatus of claim 1. It would therefore have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings to provide the apparatus of claim 1.

**Regarding claim 3**, Matschke in view of Kaiser teaches the apparatus of claim 1; Matschke fails to teach specifically wherein the distance between the walls of the chamber and the helical portion is at least about 5 mm (although such measurement seems apparent from Fig. 2). However, Kaiser teaches that the preferable cross-sectional depth of the duct is 2 to 50 mm, and the distance between the duct and the chamber wall in Fig. 2 of Matschke is clearly several times the width of the duct. The preferential width of the duct taught by Kaiser puts the optimum width at about 25 mm, so if there is even one duct-width between the duct and the wall, the distance between the wall and the helical portion is greater than 5 mm. The scale of the Matschke's drawing is significant because the purpose of the elliptical chamber walls is to maximize reflection of UV light back through the duct; a purpose which is strongly influenced by geometry. The duct dimensions taught by Kaiser are significant because Kaiser's

teachings are directed towards an optimum duct geometry. To provide the benefits of both teachings (as the rejection of claim 1 has shown that one of ordinary skill would be motivated to do), the scale of Matschke's drawings must be scaled to the dimensions taught by Kaiser (making the above logic that leads to the conclusion of a distance greater than 5 mm valid). It would therefore have been obvious to one of ordinary skill in the art at the time the invention was made to set the distance between the walls of the chamber and the helical portion to at least about 5 mm. Doing so is necessary to receive the benefits of both teachings.

**Regarding claim 4**, Matschke in view of Kaiser teaches the apparatus of claim 1; Matschke also teaches wherein the ultraviolet radiation source is tubular-shaped (Fig. 2), but fails to teach wherein the major axis of the elliptical section of the helical portion is generally parallel to the longitudinal axis of the source. However, Kaiser teaches wherein the major axis of the elliptical section of the helical portion is generally parallel to the longitudinal axis of the source (paragraph 0025). As was already explained in regards to claim 1, one of ordinary skill in the art would have used a duct with an elliptical cross section in order to obtain the benefits taught by Kaiser, and, for a tubular-shaped ultraviolet radiation source, the major axis of the elliptical section of the helical portion would inherently be parallel to the longitudinal axis of the source if the major axis of the elliptical section of the helical portion is to be perpendicular to the direction of irradiation as taught in regards to claim 1. It would therefore, for the same reasons as given in regards to claim 1, have been obvious to one of ordinary skill in the art at the time the invention was made to provide the apparatus of claim 4.

3. Claim 2 rejected under 35 U.S.C. 103(a) as being unpatentable over Matschke in view of Kaiser as applied to claim 1 above, and further in view of Gunn, et al (U.S. Patent 6,586,172 B1).

**Regarding claim 2**, Matschke in view of Kaiser teaches the apparatus of claim 1, but fails to teach wherein air circulation slits are formed on the walls of the chamber. However, Gunn teaches the need to cool the fluid to avoid heat damage to biological fluids, and suggests air-cooling by fan as a method of accomplishing this (column 2, line 66). Because a fan can only accomplish air-cooling of an area by moving air from a cooler area to the area to be cooled, it would have been common sense and obvious to one of ordinary skill in the art at the time the invention was made to form air circulation slits on the walls of the chamber. Doing so would enable a fan to blow through to cool the liquid (otherwise the air would be stopped by the chamber, and the fan would be ineffectual).

4. Claims 5 and 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Matschke in view of Kaiser as applied to claim 1 above, and further in view of Wong (U.S. Patent 7,141,222).

**Regarding claim 5**, Matschke in view of Kaiser teaches the apparatus of claim 1, but fails to teach wherein an indicator light is provided outside the chamber and is connected optically to the ultraviolet radiation source through an optical fiber placed either in contact with the lamp or within its vicinity. However, Wong teaches an indicator light (42) provided outside the chamber of an analogous ultraviolet sterilizer (Fig. 1). Wong does not teach an optical fiber placed either in contact with the lamp or within its

vicinity, but does teach ultraviolet light being received by column 41 and channeled to indicator 42. Optical fibers were well known in the art at the time the invention was made for channeling light from one place to another, and so it would have been obvious to one of ordinary skill in the art at the time the invention was made to use this well-known means of channeling light to deliver the light to column 41. A later invention by Wong (U.S. Patent Application Publication 2007/0007467 A1, a continuation in part of patent 7,141,222) does not qualify as prior art due to the filing date, but serves as evidence for the obviousness of applying an optical fiber to the indicator (the optical fiber is shown applied to the indicator light in Figs. 7-1, 7-2, and 9). The use of an optical fiber in this application was clearly obvious since it readily occurred to the inventor of the ultraviolet indicator light.

**Regarding claim 6**, claim 6 consists of the limitations of claims 1, 2 and 5. Such an apparatus is obvious in view of Matschke, Kasier and Wong for the reasons given in re claims 1, 2 and 5 above.

#### ***Response to Arguments***

5. Applicant's arguments filed 07/07/2008 have been fully considered but they are not persuasive.
6. **Regarding claims 1 and 4**, the applicant has argued that Kaiser fails to disclose that the elliptically-shaped cross-section of the duct has a major axis that is perpendicular to the direction of radiation. As explained in the statement of rejection, however, Kaiser teaches the obvious modification of Matschke to create an elliptically-shaped cross-section of the duct with a major axis that is perpendicular to the direction

of radiation through paragraph 0025, which states that it is advantageous to provide a shape that is flattened in the direction of the radiation. When applied to Matschke's circular tube cross-section, the advantageous flattening in the direction of the radiation results in an elliptical cross-section that has a major axis perpendicular to the direction of radiation. The applicant's response to paragraph 0025 or Kaiser is that this paragraph is not related to the problem intended to be solved by the applicant. The fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

7. **Regarding claim 2**, the applicant first argues that one of ordinary skill in the art would not be motivated to combine Matschke and Kaiser with the teachings of Gunn. However, as explained in the statement of rejection, Gunn's air cooling modification would be advantageous to the apparatus taught by Matschke and Kaiser because it would prevent the heat damage of biological fluids sent through the apparatus. This is ample reason for one of ordinary skill in the art, being aware of Gunn's teachings, to add them to Matschke's apparatus as modified by Kaiser. The applicant then argues that "because applicant's invention does not use a fan, but rather relies only on slits on the walls of the chamber, there would be no suggestion nor any motivation to combine the teachings of Gunn et al with those of Matschke et al or Kaiser et al as to the need to use both a fan and slits." This argument, however, is not relevant to the reasonableness of the combination of Matschke and Kaiser with Gunn. The applicant's

invention may not use a fan, but a fan is not excluded from the claims. The examiner has explained why one of ordinary skill in the art, armed with the knowledge of Matschke, Kaiser, and Gunn would provide slits for air cooling. That the applicant's invention may advantageously operate without a fan does not exclude the presence of a fan from the current claim wording, nor can hindsight of the applicant's own invention serve to teach away from the motivation provided by Gunn to include a fan and slits.

8. **Regarding claim 5**, the applicant first argues that, unlike applicant's invention, Wong teaches an *indirect* light indicator (emphasis as given by applicant on p. 15 of reply filed 07/07/2008). The applicant implies that the indicator of the present invention is a direct light indicator that does not convert UV radiation to any other form of light and is thus simpler to implement. This argument, however, relies upon limitations not present in the claim. The claim only requires "an indicator light," it does not specify any particular type of indicator light. The applicant then challenges the examiner's assertion that the use of optical fibers to convey channel light from one place to another was well-known at the time the invention was made. As further evidence of this assertion, the examiner presents Ellner (U.S. Patent RE 34,513) which shows an optical fiber (90) being used to transport light from an ultraviolet lamp (28) to an output face (96) for the purpose of monitoring said lamp. The examiner therefore considers the assertion that it was well known at the time of the invention to use an optical fiber in the vicinity of an ultraviolet lamp to transport light to an indicator light to be fully evidenced (note that Ellner was published in 1994, 10 years before applicant's invention).

9. No argument was presented to refute the rejection of claim 3.

***Conclusion***

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL MASKELL whose telephone number is (571)270-3210. The examiner can normally be reached on Monday-Friday 8AM-5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 571/272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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